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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/498,336	02/04/00	SHIELDS	J 52352-372

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IM22/0717

EXAMINER

PEREZ RAMOS, V

ART UNIT

PAPER NUMBER

1765

7

DATE MAILED: 07/17/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

**Office Action Summary**

Application No.

09/498,336

Applicant(s)

SHIELDS ET AL.

Examiner

Vanessa Perez-Ramos

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admission of the Prior Art, in view of Solis (U.S. 5851302).

In regard to claims 1, 3 and 12-14, Applicant admits that it is well known prior art to: form a plurality of dielectric layers (page 2, lines 3-22); to form a plurality of patterned conductive layers, wherein the conductive layers have gaps or "via openings", and wherein the gaps are filled (page 2, lines 3-22); to deposit photoresist masks, which are later removed (page 6, lines 1-9); and to form through holes that are later cleaned to remove polymeric residues (page 6, lines 9-10). Applicant also admits that it is well known to form borderless vias (page 6, line 3), and, furthermore, Applicant admits the advantages of utilizing gap fill layers and/or dielectric layers having dielectric constants no greater than about 3, such as HSQ, advantages which include: avoidance of poison via problems, reduction of etch back steps, increased planarity and enhanced gap filling, among others.

Applicant does not disclose that the steps of removing the photoresist mask and cleaning the through hole are performed with a plasma containing CF<sub>4</sub> and H<sub>2</sub>O, but with an O<sub>2</sub> plasma.

Solis discloses a process for forming via contact holes, including a step of removing a photoresist mask with a plasma comprising CF<sub>4</sub> and H<sub>2</sub>O vapor (col. 2, lines 45-64).

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It is the Examiner's position that it would have been obvious to one skilled in the art at the time of the invention to modify the conventional method disclosed by Applicant in his Admission of the Prior Art by removing the photoresist layer with a plasma comprising CF<sub>4</sub> and H<sub>2</sub>O, as per Solis, because, as stated by Solis, "an etch gas mixture comprising CF<sub>4</sub> and H<sub>2</sub>O exhibits very aggressive ashrate of photoresist" (col. 2, lines 6-9), which is very desirable during semiconductor manufacturing.

In regard to claims 2, 4-11 and 15-20, it is the Examiner's position that the variation of process parameters is obvious to one skilled in the art with the purpose of establishing the best process mode.

### ***Response to Arguments***

3. Applicant's arguments filed 6/22/01 have been fully considered but they are not persuasive.

It is noted that the only argument presented by Applicant was the non-applicability of the Kepler reference (U.S. 6046104) as prior art, because both the claimed invention and the Kepler patent are assigned to Advanced Micro Devices, Inc. However, this argument is moot in view of the new grounds of rejection, based upon new references.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vanessa Perez-Ramos whose telephone number is 703-306-5510. The examiner can normally be reached on Mon-Fri 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 703-308-3836. The fax phone numbers for the

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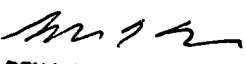
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organization where this application or proceeding is assigned are 703-305-7718 for regular communications and 703-305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-5665.

Vanessa Perez-Ramos  
Examiner  
Art Unit 1765

VPR  
July 15, 2001

  
BENJAMIN L. UTECH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700